7. Affected Environment and Environmental Consequences (Physical Environment)

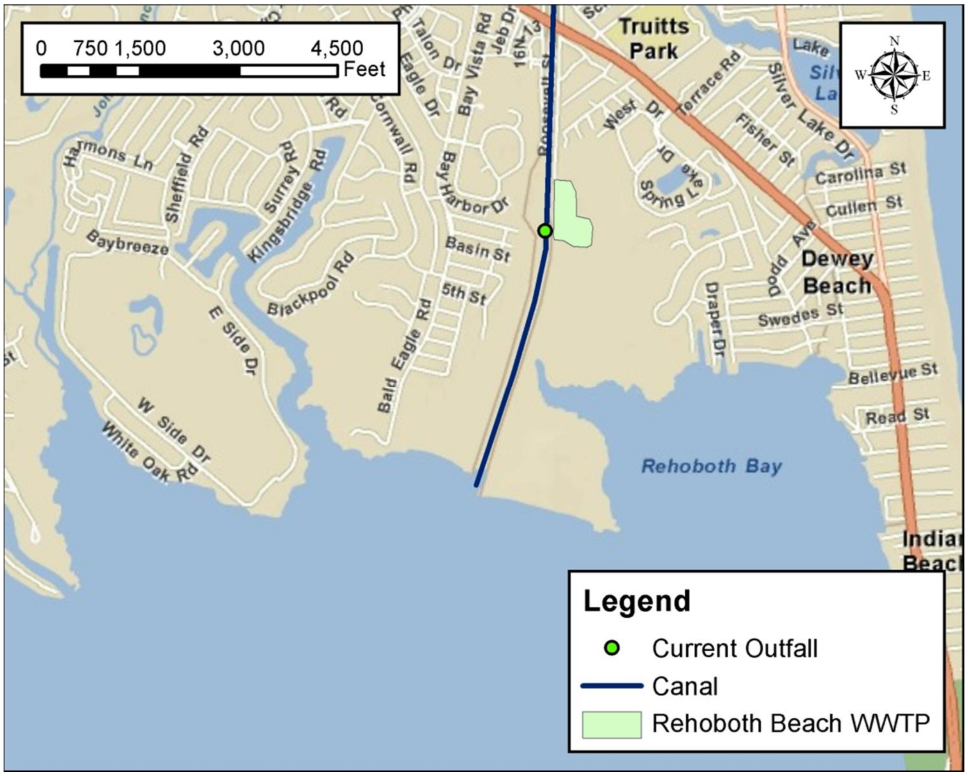
As discussed in Section 4.1, previous studies and public outreach in the form of workshops, newspaper articles, presentations and public hearings have allowed an informal consensus to be reached by the City and the citizens with the result that the ocean outfall is the preferred alternative. All other options were determined to be technically or financially infeasible. In order to evaluate the environmental consequences of the ocean outfall, the environmental consequences of the no action alternative and the dedicated land application alternative were investigated, and those alternatives were compared to the ocean outfall.

7.1 Compared Alternatives

7.1.1 No action

Under the no action alternative, treated effluent continues to be discharged into the Lewes-Rehoboth Canal through the current outfall, as shown in Figure 7-1. As discussed in Section 4.1, this is not a feasible option since it would violate the consent order requiring the elimination of all point discharges into the Inland Bays, which includes Rehoboth Bay. Despite this, the environmental impacts of this alternative were investigated in detail to provide a point of comparison to the ocean outfall alternative.

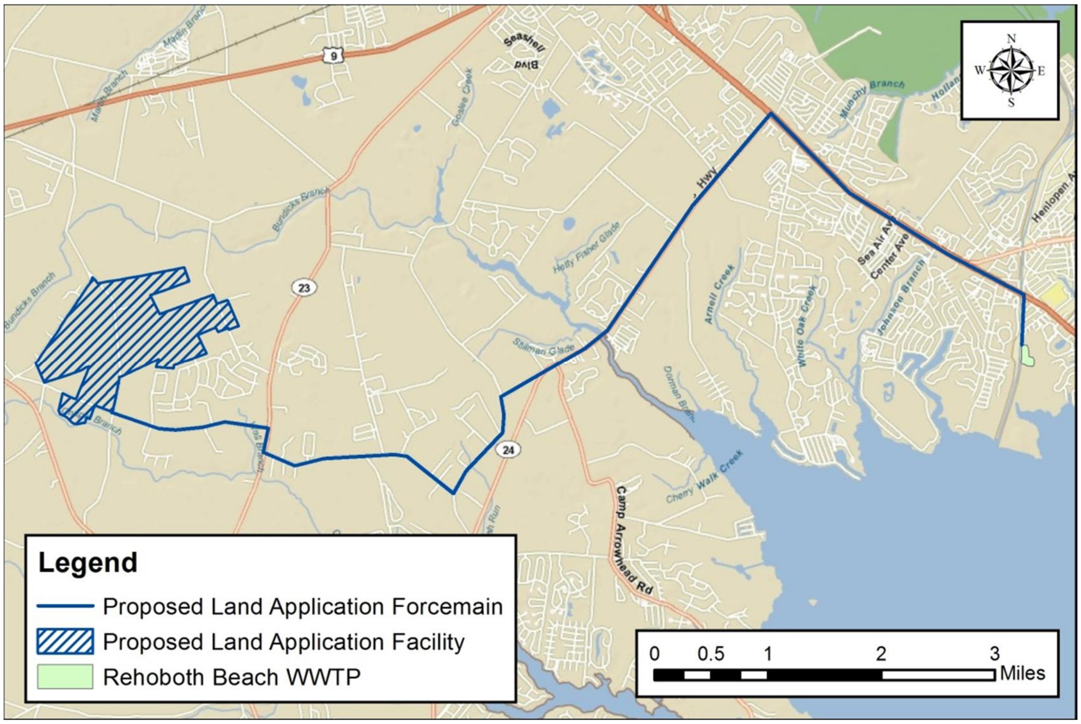
Figure 7-1 No Action Alternative



7.1.2 Land Application

Under the land application alternative, treated effluent is pumped from RBWWTP to a spray irrigation facility to be land applied. As discussed in Chapter 3, none of the five land application alternatives originally considered were determined to be feasible, since insufficient land was determined to be available and cooperation with Sussex County is no longer expected to occur. In order to provide a point of comparison to the ocean outfall alternative, the environmental impacts of a dedicated land application facility were investigated in detail, as this is the option that would potentially have the greatest impact on the environment. The spray irrigation facility and forcemain alignment proposed in the “2005 Effluent Disposal Study” (Stearns & Wheler 2005) is shown in Figure 7-2 and was used as a basis for evaluating the potential environmental impact of land application.

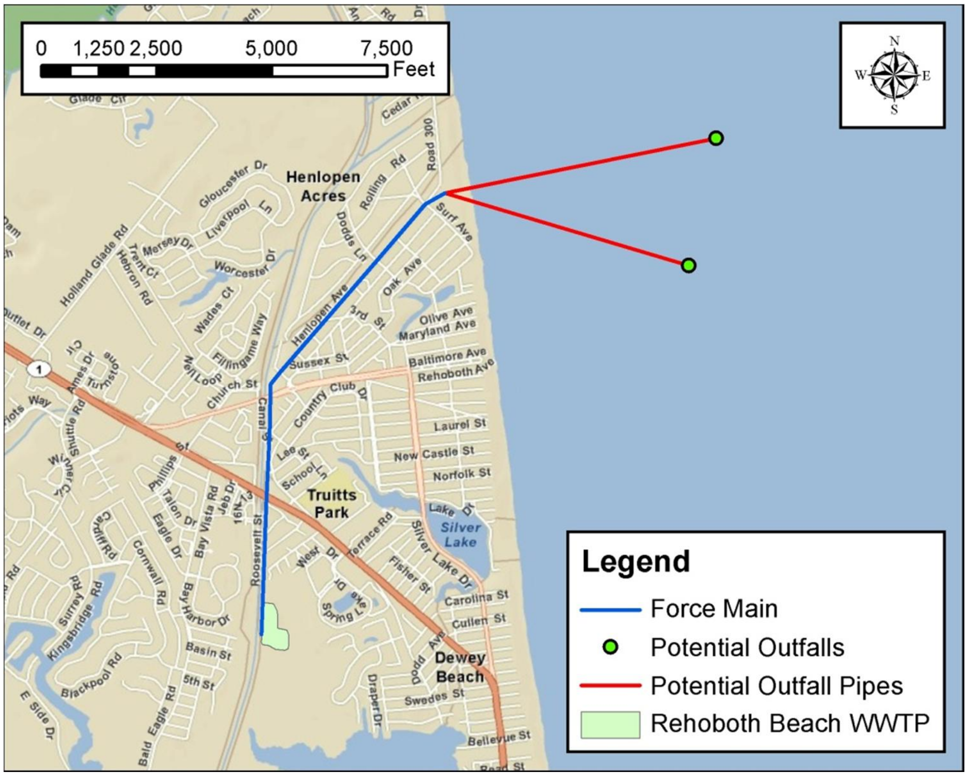
Figure 7-2 Land Application Alternative



7.1.3 Ocean outfall

Under the ocean outfall alternative, treated effluent is pumped from RBWWTP to an ocean outfall located more than a mile off coast in the Atlantic Ocean. Two potential locations were considered for the ocean outfall, both extending out from the beach access parking lot located at the intersection of Henlopen Ave and Duneway. Only one of the two proposed outfall pipe and outfalls will be constructed. An ocean outfall, as shown in Figure 7-3 is the only feasible option and the preferred alternative.

Figure 7-3 Ocean Outfall Alternative



7.2 Air Quality/Odor

7.2.1 Air Quality/Odor Environment

The Air Quality Index (AQI) is an indicator of overall air quality, taking into account the criteria pollutants established by the Clean Air Act of 1970. These pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), particulate matter smaller than 2.5 micrometers (PM2.5) and particulate matter smaller than 10 micrometers (PM10) (USEPA 2008). Table 7-1 shows AQI data for Sussex, New Castle, and Kent Counties for the year 2008. In Sussex County, the most frequent pollutant detected was ozone (O_3) followed by particulate matter smaller than 2.5 micrometers (PM2.5). In a ranking based on the highest AQI recorded, Sussex County was the 167th highest out of the 1013 counties with recorded data (USEPA 2008).

Table 7-1 Air Quality Index (AQI) Data for Delaware Counties (USEPA 2008)

	Sussex	New Castle	Kent
Number of Days with AQI Reported	244	306	250
Number of Days when Air Quality was…			
Good (AQI between 0 and 50)	167	201	185
Moderate (AQI between 51 and 100)	67	95	57
Unhealthy for Sensitive Groups (AQI between 101 and 150)	10	9	8
Unhealthy (AQI higher than 151)	0	1	0
AQI Statistics			
Maximum	140	179	122
90th percentile	80	84	74
Median	43	43	42
Number of Days when AQI pollutant was:			
CO		1	
NO_2		0	
O_3	204	181	198
SO_2		1	
PM2.5	40	123	52
PM10		0	

7.2.2 Short Term / Temporary Impacts

7.2.2.1 No action

No construction will occur under the no action alterative, so there will be no short term or temporary impacts.

7.2.2.2 Land Application

Short term / temporary impacts to air quality/odor for the land application alternatives would result from the emissions of construction vehicles and equipment along the forcemain and at the spray irrigation facility. The extent of the impacts would differ slightly based on the amount of construction required for each land application alternative, but any impacts would be minor.

7.2.2.3 Ocean outfall

The ocean outfall alternative would result in minor short term impacts to air quality along the forcemain and at the directional drilling staging area. These impacts are the result of emissions from construction vehicles and equipment, especially the drilling equipment and barge needed for directional drilling.

7.2.3 Long Term / Chronic Impacts

7.2.3.1 No action

Currently, high nutrient concentrations in Rehoboth Bay have led to eutrophication or the excess growth of algae (DNREC 1998). After the algae dies, it begins to rot and decay within the water, producing a hydrogen sulfide odor, which can persist for weeks (DNREC 2001). Although non-point discharges from agricultural operations within the Rehoboth Bay watershed are the leading source of nutrients (Martin, et al. 1996), the RBWWTP effluent does contribute nutrients to the Bay. The production of odors will decrease as other nutrient sources stop discharging into the Bay. However, if the RBWWTP continues to discharge into the Bay, nitrification will continue to occur, and odors will persist.

7.2.3.2 Land Application

Treated effluent is odor free, so there is not expected to be any long term impacts to air quality/odor from land application of effluent. Although nutrients within the effluent will eventually reach the bay through the groundwater, uptake by crops and dilution with groundwater will minimize the nutrient loading on the bay and the conditions that lead to algae blooms and odor production.

7.2.3.3 Ocean outfall

There would be no significant long term air quality / odor impacts from the disposal of treated effluent through an ocean outfall. Nutrients within the effluent would be rapidly dispersed in the ocean, preventing the high concentrations that lead to algae blooms and odor production.

7.3 Soils/Groundwater

7.3.1 Soils/Groundwater Environment

A soil map of the area in the vicinity of the proposed project is shown in Figure 7-4. The five most predominate soil types within the area shown are presented in Table 7-2.

Figure 7-4 Soils Types Within Project Vicinity (NRCS 2006)

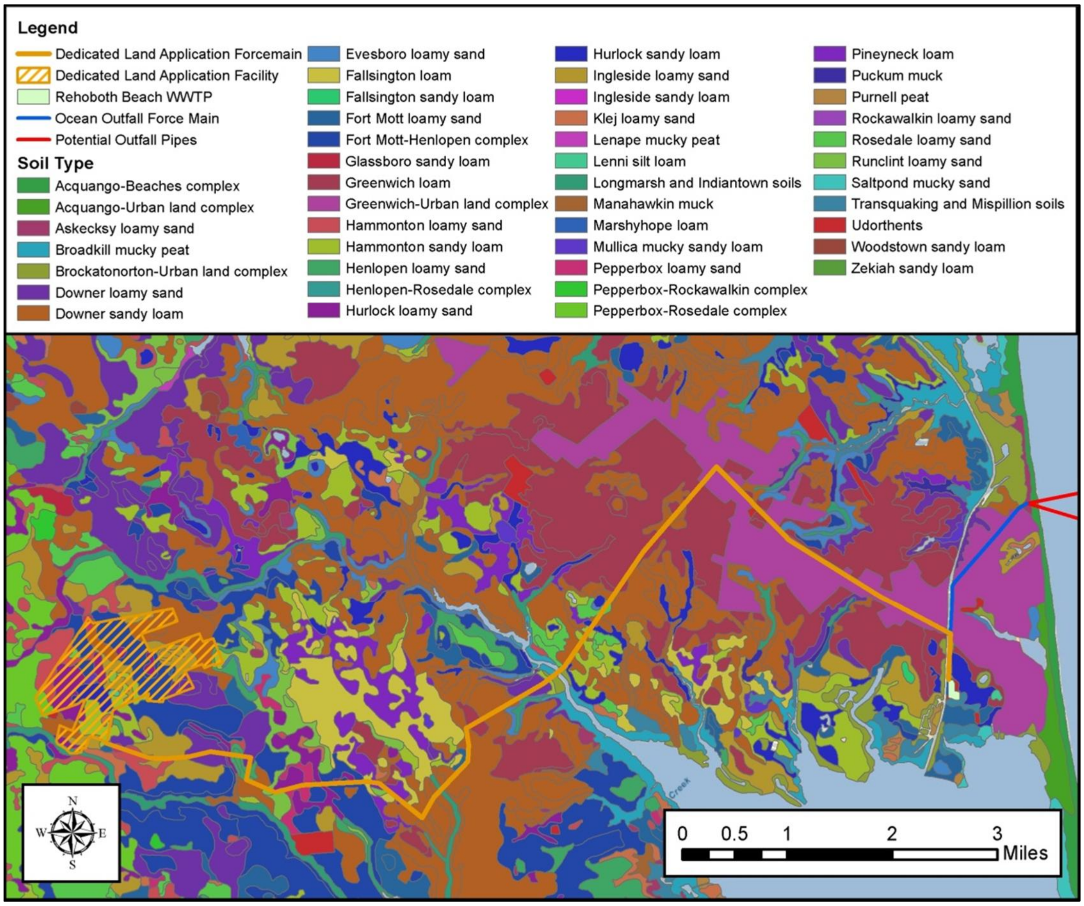


Table 7-2 Predominate soil types within project vicinity (NRCS 2006)

Row Labels	Area (sq. mi)	Area (sq. km)
Downer sandy loam	13.09	33.92
Greenwich loam	7.23	18.74
Fort Mott-Henlopen complex	3.97	10.29
Downer loamy sand	3.72	9.64
Greenwich-Urban land complex	3.43	8.90

7.3.2 Short Term / Temporary Impacts

7.3.2.1 No action

No construction will occur under the no action alterative, so there will be no short term impacts.

7.3.2.2 Land Application

Construction of the land application facility and forcemain may result in minor short term impacts to soil. No short term impacts to groundwater is expected.

7.3.2.3 Ocean outfall

Construction of the ocean outfall forcemain may result in minor short term impacts to soil. No short term impacts to groundwater is expected.

7.3.3 Long Term / Chronic Impacts

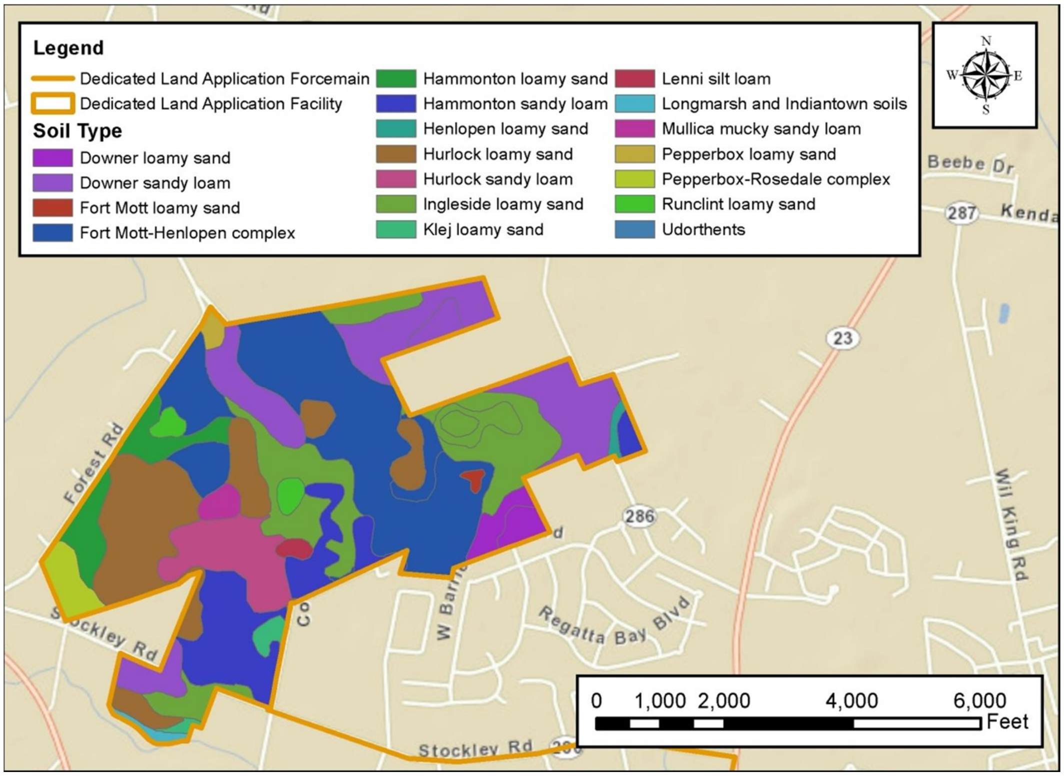
7.3.3.1 No action

There will be no long term impacts to the soil or groundwater under the no action alternative since effluent will continue to be discharged to surface waters. Groundwater will not be recharged, but according to DGS, "Delaware local rainfall, approximately 40" to 44" per year, renews part or all of our water supply on a regular basis" (Woodruff 1986).

7.3.3.2 Land Application

Soils at the proposed dedicated land application site are shown in Figure 7-5. The predominate three soils within the area are Fort Mott-Henlopen complex, Downer sandy loam, and Ingleside loamy sand (NRCS 2006).

Figure 7-5 Soils Within Dedicated Land Application Facility (NRCS 2006)



The use of treated effluent is a viable and conventional source of water and nutrients for irrigation of agricultural crop, landscape, or other public spaces. To assess the effects of treated effluent irrigation on the long-term changes of soil, Qian (2006) compiled soil test data from landscape sites around metropolitan Denver, CO that had been irrigated exclusively with treated effluent for four to 33 years. The results show that after at least four years of irrigation, the soils exhibited 0.3 units of higher pH and 200 percent, 40 percent, and 30 percent higher concentrations of extractable sodium, boron, and phosphorus, respectively. Compared to sites irrigated with surface water, sites irrigated with treated effluent exhibited 187 percent higher electrical conductivity and 481 percent higher sodium adsorption ratio (SAR) of saturated paste extract. The significantly higher soil SAR in treated effluent-irrigated sites compared to surface water irrigated sites provided reason for concern about possible long-term reductions in soil hydraulic conductivity and infiltration rate in soil with high clay content, although these levels were not high enough to result in short-term soil deterioration. Comparison of soil chemical properties before and four or five years after treated effluent irrigation on two golf courses also revealed the following findings: a) 89-95 percent increase in sodium content; b) 28-50 percent increase in boron content; and c) 89 -117 percent increase in phosphorus content at the surface depth (Qian 2006).

In addition, the use of poorly constructed sewage treatment works and land application of sewage can lead to groundwater contamination close to water supply sources. Microbiological, in particular virus survival in these circumstances is not well understood, but there are indications of extended pathogen survival and therefore increased public health risk (Pedley and Howard 1997).

However, a different result on the long term effect of irrigation with treated effluent has also been reported. A study in India is conducted by testing soil properties and heavy metal concentration from soil samples collected from treated effluent irrigation sites. The results revealed that after 35 years of treatment with treated effluent, the total salt and heavy metal content was high compared to ground water but still within the safe limit (Rana, Dhankar and Chhikara 2010). Considering that the study was conducted in the area where wastewater is minimally treated before used in irrigation, it is expected that the impact of land application using effluent from advanced wastewater treatment plant would be better than acceptable level.

More study is needed to confirm the long term effects of land application using treated effluent. Understanding the responses of plants and soils to treated effluent irrigation and identifying proper management practices are critical to the long-term success of the land application practice.

Pathogenic microorganism may spread through soil and ground water. Viruses can migrate to considerable distance in the subsurface, down to 220 ft. depth and more than 1,300 ft. horizontally (Keswick and Gerba 1980). According to Borchardt, et al. (2007), viruses can even move through the overlying protection of a low permeability soil layers to contaminate an aquifer. Factors that may influence virus movement in groundwater (Gerba and Goyal 1985) are summarized in Table 7-3.

Delaware regulations require that both soil and groundwater influenced by land application effluent be regularly tested (DNREC 1999). Soil would need to be sampled once per year for key constituents that accumulate and are potentially harmful, such as metals and priority pollutants. (DNREC 1999). Groundwater sampling would need to conform to DNREC's "Manual for Groundwater Sampling" and testing may include depth to groundwater, pH, chemical oxygen demand (COD), total organic carbon (TOC), nitrate nitrogen, total phosphorus, electrical conductivity, chloride, fecal coliform bacteria, metals and priority pollutants (DNREC 1999).

Table 7-3 Factors that may influence virus movement in groundwater (Gerba and Goyal 1985)

Factor	Comments
Soil type	Fine-textured soils retail viruses more effectively than light-textured soils. Iron oxides increase the adsorptive capacity of soils. Muck soils are generally poor adsorbents.
pH	Generally, adsorption increases when pH decreases. However, the reported trends are not clear-cut due to complicating factors.
Cations	Adsorption increases in the presence of cations. Cations help reduce repulsive forces on both virus and soil particles. Rainwater may desorb viruses from soil due to its low conductivity.
Soluble Organics	Generally compete with viruses for adsorption sites. No significant competition at concentrations found in treated effluents. Humic and fulvic acids reduce virus adsorption to soils.

Factor	Comments
Virus type	Adsorption to soils varies with virus type and strain. Viruses may have different isoelectric points.
Flow rate	The higher the flow rate, the lower virus adsorption to soils
Saturated vs. unsaturated flow	Virus movement is less under unsaturated flow conditions

7.3.3.3 Ocean Outfall

There will be no long term impacts to the soil or groundwater under the ocean outfall alternative since effluent will continue to be discharged to surface waters. Groundwater will not be recharged, but according to DGS, "Delaware local rainfall, approximately 40" to 44" per year, renews part or all of our water supply on a regular basis" (Woodruff 1986).

7.4 Surface Water Quality/Quantity

7.4.1 Existing Water Quality in Rehoboth Bay

Water quality data within Rehoboth Bay was collected by DNREC from September 1, 2002 through August 31, 2007 (DNREC 2010a). A summary of the water quality data is presented in Table 7-4. As discussed in Chapters 2 and 3, multiple surface water quality standards are not met within Rehoboth Bay, which is why the TMDL for Rehoboth Bay was developed and the consent order was issued to cease discharge of RBWWTP treated effluent into the Bay.

Table 7-4 Water Quality Data within Rehoboth Bay (DNREC 2010a)

Station	Location	Salinity (‰)	DO (mg/L)	Enterococcus Geometric mean (CFU/ 100 mL)	Dissolved inorganic nitrogen (mg/L)	Dissolved inorganic Phosphorus (mg/L)
308051	Guinea Creek at Rt. 298 Bridge	9.6	6.5	117.8 *	1.35 *	0.018 *
308291	Love Creek, Rd. 277	0.2	7.3	18.1	1.17	0.013 *
308371	Bundick's Branch at Rt. 23	0.2	7.4	205 *	4.21 *	0.018 *
306071	Buoy 3, Rehoboth Bay	27.7	6.9	6.6	0.07	0.03 *

Station	Location	Salinity (‰)	DO (mg/L)	Enterococcus Geometric mean (CFU/ 100 mL)	Dissolved inorganic nitrogen (mg/L)	Dissolved inorganic Phosphorus (mg/L)
306091	Buoy 7, Rehoboth Bay	28.6	6.3	5.7	0.07	0.031 *
306111	Massey's Ditch at Bouy 17	29.3	6.7	7.1	0.09	0.032 *
308031	Burton Pond, Rd. 24	0.1	7.2	20	0.73 *	0.011 *
Surface Water Quality Standard		n/a	5.0	35	0.14	0.01

Note: Data marked with an asterisk (*) exceeds the relevant water quality standard

7.4.2 Existing Water Quality in the Ocean

Delaware ranked second only to New Hampshire in a 2009 rank of beachwater quality by state (Dorfman and Rosselot 2010). The ranking was based on the percentage of beachwater samples that exceeded the BEACH Act's single-sample maximum standards. In Delaware, samples from 25 beaches in Sussex County were taken once a week from May to September of 2009, and only 2% of the reported beach monitoring samples exceeded the state's daily maximum enterococcus single-sample standard of 104 CFU per 100 ml (Dorfman and Rosselot 2010). In 2009, 94 closing/advisory days were issued in Delaware for events lasting no more than six consecutive weeks. At the four sample sites in Rehoboth Beach, no samples were found to exceed state standards, and no closing or advisory days were issued.

On November 18, 2010 and June 30, 2011, water quality data was collected at the two potential outfall locations by WHG during field data collection, and provided to DNREC for analysis. In addition, water quality data at other points near the outfall had been previously collected by other entities. Locations where water quality was tested are shown in Figure 7-6. A summary of the parameters measured during each test are presented in Table 7-5. Full results of each test are included in (Appendix K).

Figure 7-6 Water Quality Data Collection Locations (DNREC 2007) (Sharp 1998)

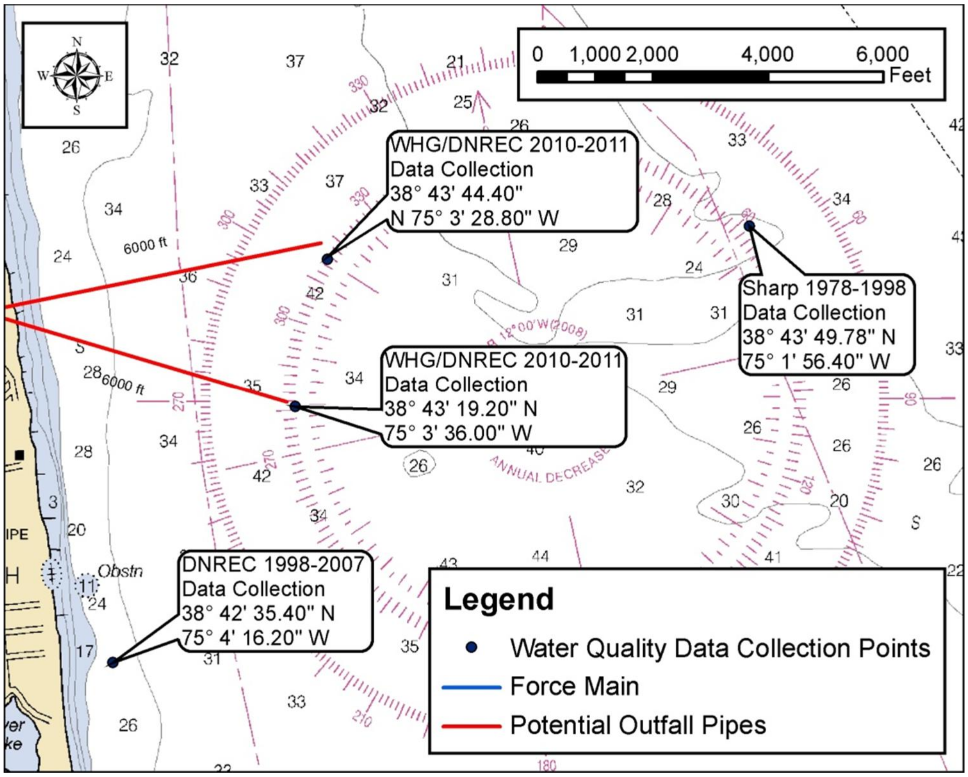


Table 7-5 Water Quality Data Collected (DNREC 2007) (Sharp 1998)

Data Set	Date	Parameters Measured
Delaware Estuary Cruise Database from the Laboratory of Jonathan H. Sharp	1/13/98	Temp, Salinity, DO, O-Sat, NO_2, NO_3, NH_4, PO_4, Si, DOC, Seston, Chlorophyll a
Delaware Ambient Statewide Surface Water Quality Monitoring Program	6/23/1998 to 5/22/2007 at intervals ranging from 1 to 8 months	Aluminum, Ammonia-nitrogen as N, Arsenic, Cadmium, Calcium carbonate as CaCO3, Carbonaceous biochemical oxygen demand, standard conditions, Chloride, Chlorophyll a, Chromium(VI), Copper, Depth, Secchi disk depth, DO, Enterococcus, Hardness, Calcium, Magnesium, Inorganic nitrogen (nitrate and nitrite) as N, Iron, Kjeldahl nitrogen, Lead, Nutrient-nitrogen, Organic carbon, Orthophosphate as P, pH, Pheophytin a, Phosphate-phosphorus as P,

Data Set	Date	Parameters Measured
		Salinity, Specific conductance, Temperature, air, Temperature, water, Total suspended solids, Turbidity, Zinc
DNREC Water Quality Data for Rehoboth Beach Outfall Project	11/18/2010, 6/30/2011	BOD_5, Enterococcus, Total Nitrogen (Alkaline Persulfate), Total Phosphorus (Alkaline Persulfate), Nonfilterable Residue (TSS)

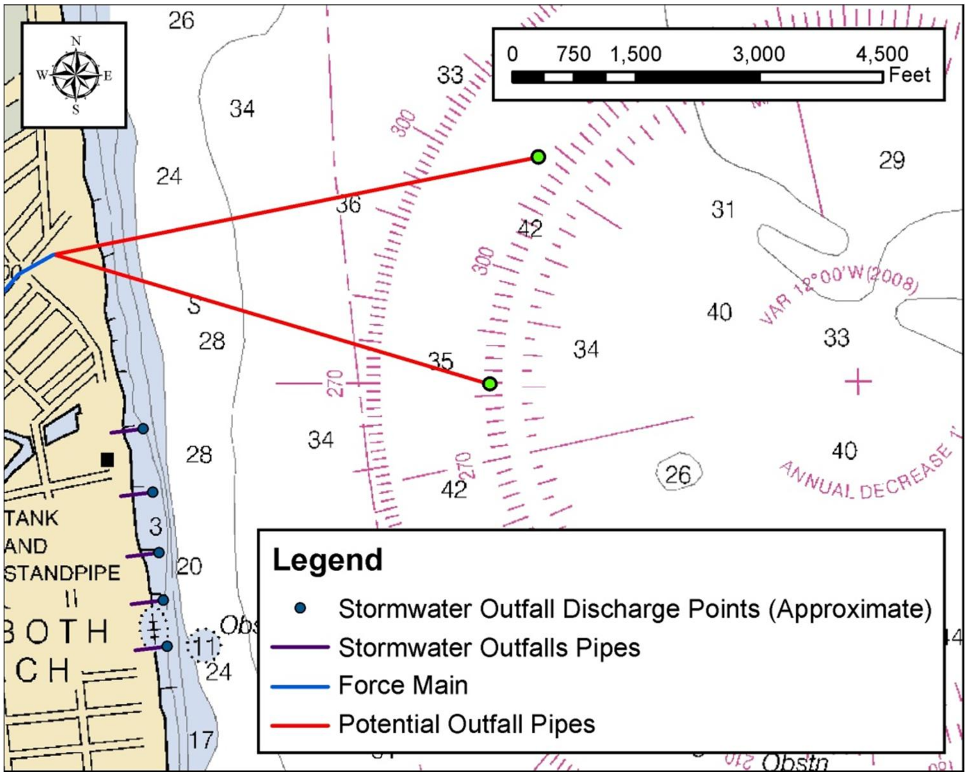
7.4.3 Sources of Poor Water Quality

7.4.3.1 Stormwater Impacts

Ninety two of the 94 closing/advisory days issued within Delaware in 2009 were due to contamination from stormwater runoff and two were of unknown origin (Dorfman and Rosselot 2010). DNREC has determined that 3.5 inches of rainfall in a 24 hour period, or 3 inches in a 12 hour period may trigger a pre-emptive closing due to concerns of water quality (Dorfman and Rosselot 2010). Stormwater is a major source of pollution across the country, with an estimated 10 trillion gallons of untreated stormwater entering surface waters every year in the United States (Dorfman and Rosselot 2010). Typical contaminants in stormwater include oil and grease, pesticides, litter, pollutants from vehicles, and fecal matter from dogs, cats, other animals, and humans (Dorfman and Rosselot 2010).

In the City of Rehoboth Beach, stormwater enters the ocean through multiple stormwater outfalls. The existing stormwater outfalls are all only a couple hundred feet long, and thus there is not enough space for dilution of the contaminants before reaching swimming zones. The approximate location of the existing stormwater outfalls are shown in Figure 7-7 (Salin 1992).

Figure 7-7 Stormwater Outfalls in Rehoboth Beach (Salin 1992)



7.4.4 Short Term / Temporary Impacts

7.4.4.1 No action

No construction will occur under the no action alterative, so there will be no short term impacts.

7.4.4.2 Land Application

Construction of the forcemain and land application site will have minimal impact on surface water quality due to increased erosion and sedimentation at the staging area during construction. Silt fencing and other erosion control methods would effectively mitigate this impact.

7.4.4.3 Ocean outfall

Construction of the forcemain will have minimal impact on surface water quality due to increased erosion and sedimentation at the staging area during construction. Silt fencing and other erosion control methods would effectively mitigate this impact.

Trenching in the ocean will agitate the ocean floor, which may temporarily increase turbidity and release biological and chemical substances that have settled into the sediment. Plumes of turbidity are more likely to occur when disturbing sediments with high silt or clay content (Louis Berger Group, Inc. 1999). Core samples taken at the Hen and Chicken Shoals indicate a strata consisting of primarily granular materials (fine and medium sands with trace gravels) with only trace amounts of fine-grained materials (silts and clays) (USACE 2002). Thus, the impacts from turbidity should be localized and minimal.

Agitation to the seabed can re-suspend contaminants within the sediments, which may have lethal and sublethal effects on fisheries (Johnson, et al. 2008). Metal contamination is typically associated with fine-grain sediments or sediments with high organic content. Samples at the Hen and Chicken Shoals indicate mostly coarse sediments with low organic content, so it is unlikely that trenching of the outfall pipe will re-suspend metals. In addition, since the nearby area is not heavily urbanized, the sediments are likely not heavily contaminated.

No surface disturbances will result from construction of the directionally drilled component of the outfall pipe. However, the potential for the release of drilling fluid into the ocean when utilizing directional drilling exists. This typically results from a build up of hydraulic pressure within the bore hole, leading to fractures forming in the surrounding rock through which drilling fluid can be transported to the ocean. Incidents such as this are referred to as “frac-outs”. To minimize the risk of frac-outs, the drilling fluid pressure will be carefully monitored during drilling. If the pressure increases to levels where frac-out could occur, drilling will be stopped until the risk can be mitigated.

Johnson et. al (2008) detail best management practices when utilizing directional drilling under sensitive habitats to avoid/minimize impacts to essential fish habitats from frac-outs. These include:

- The use of nonpolluting, water-based lubricants should be required.
- Drill stem pressures should be monitored closely so that potential frac-outs can be identified.
- Drilling should be halted, if frac-outs are suspected.
- Above ground monitoring should be employed to identify potential frac-outs.
- Spill clean-up plan and protocols should be developed, and clean-up equipment should be on-site to quickly respond to frac-outs.

If frac-outs do occur, impacts to the environment will be minimal because the drilling mud is inert and will settle out rapidly. The MSD Sheet for typical drilling mud is provided in (Appendix M).

7.4.5 Long Term / Chronic Impacts

7.4.5.1 No action

Continuing to discharge into Rehoboth Bay under the no action alternative would slow the recovery of the Bay from nutrient over enrichment. As discussed in Section 3.1.1.2 of this report, over enrichment leads to excessive macroalgae growth, phytoplankton bloom, large diurnal swings in dissolved oxygen, loss of submerged aquatic vegetation, and fish kills. Section 9.7.2.1 of this report details the impacts of the bacterial and chemical effluent components.

7.4.5.2 Land Application

Design standards for land application systems prohibit the application of treated effluent at rates that will exceed the hydraulic capacity of the soils. Thus, there should be no runoff from the site into surface waters. However, the effluent percolates through the soil and into the shallow aquifer, which eventually leads to surface waters. It has been estimated that groundwater makes up approximately 70% of the flow in fresh water streams (Türkmen, et al. 2008). While additional treatment is achieved as the effluent percolates through the soil and the roots of the crops, some nutrients remain and will enter the Inland Bays eventually. Thus, although a land application site could likely be permitted if suitable land was available, the fact that some nitrogen would eventually reach the Inland Bays implies that this alternative does not strictly comply with the intent of the consent order. Land application regulations require the percolated effluent nitrate concentration not exceed the state drinking water standard of 10 mg/L (DNREC 1999). Of the 6 mg/L of total nitrogen within the treated effluent, only 4 to 5 mg/L is nitrate, so the drinking water standard is met even before crop uptake and soil percolation provide additional treatment. Section 9.7.2.2 of this report details the impacts of the bacterial and chemical effluent components.

7.4.5.3 Ocean Outfall

The outfall piping will be buried, and the seabed contours will be restored to their original configuration after backfilling. The diffuser will be exposed, but it will be located at or slightly above grade. Thus, there will be no long term effects on the near shore wave patterns or sedimentation patterns.

The total amount of treated effluent discharged into surface waters will not be affected by the construction of an ocean outfall. The effluent discharge point will only be moved from the Lewis-Rehoboth Canal to the location of the outfall, 5,430 feet offshore. Discharge into the ocean will have a much smaller impact on water quality than discharge into the Bay since the volume of water in the ocean is much greater.

Chapter 5 of this report discusses the characteristics of effluent discharged from RBWWTP, and Chapter 6 details the results of the ocean discharge dilution model. According to the model, nutrients within the effluent will be dispersed to levels indistinguishable from existing ocean nutrient levels well within the zone of initial dilution. This rapid dilution will prevent the conditions that have led to eutrophication in Rehoboth Bay.

The standards for bacterial and chemical water quality that are protective of human health have been established by DNREC in the “State of Delaware Surface Water Quality Standards” (DNREC 2004). Section 9.7.2.3 of this report details the impacts of the bacterial and chemical effluent components.

7.5 Floodplains

7.5.1 Floodplain Description

A floodplain is the area susceptible to inundation by floodwaters from any source. The 100-year flood has a 1 in 100 chance of occurring during any given year. The 100-year floodplain is the land that will be covered by the 100-year flood and is usually mapped out by Flood Insurance Maps. Encroachment on floodplains increases the impact of flooding and damage.

7.5.2 Short Term / Temporary Impacts

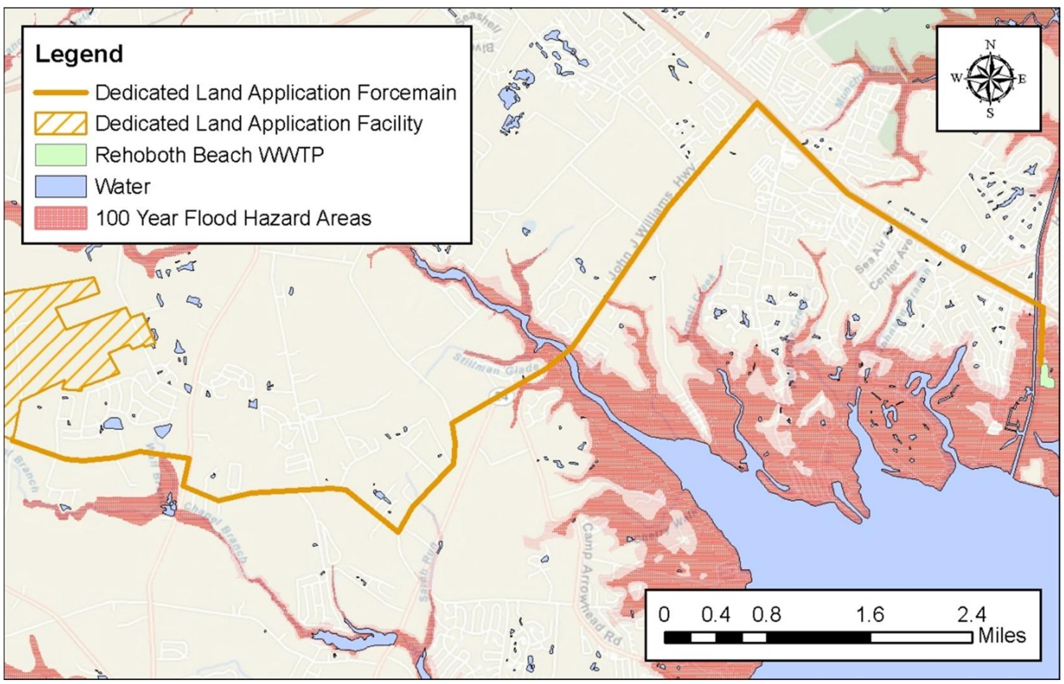
7.5.2.1 No Action

No construction will occur under the no action alterative, so there will be no short term impacts.

7.5.2.2 Land Application

A portion of the proposed forcemain alignment for the dedicated land application facility is within the 100 year floodplain, as shown in Figure 7-8. There exists the potential for short term floodplain impacts in this area.

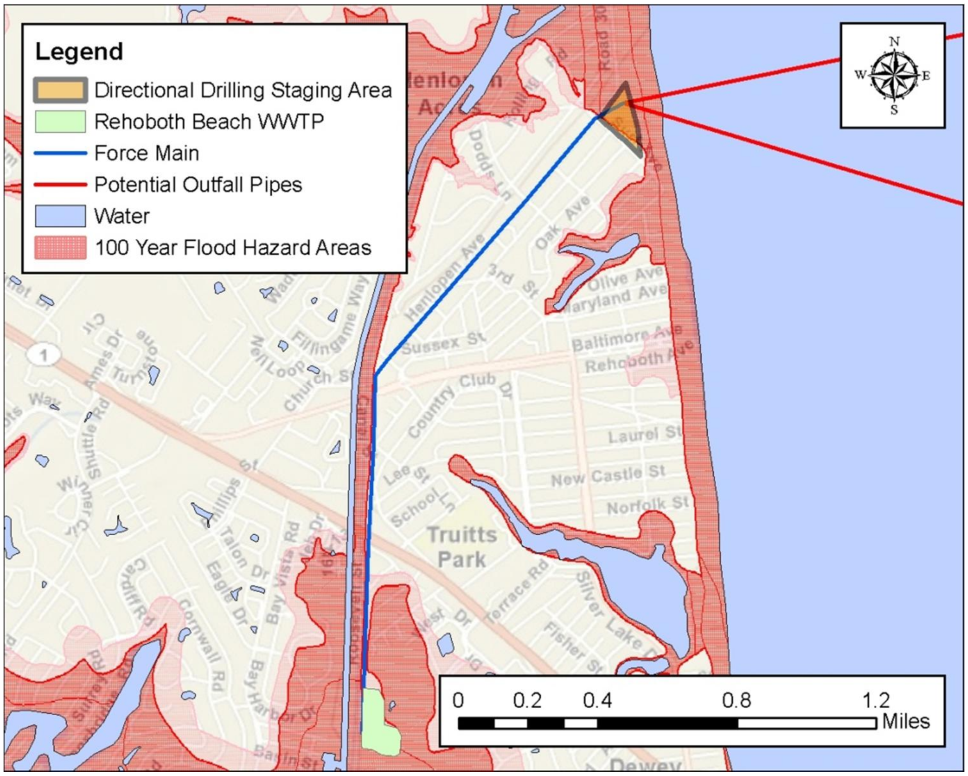
Figure 7-8 Flood Hazard Areas Along the Land Application Forcemain Alignment (FEMA 2005)



7.5.2.3 Ocean Outfall

Although the majority of the ocean outfall forcemain is located outside of the 100 year floodplain, the directional drilling staging area is within the floodplain (FEMA 2005). Construction of the ocean outfall thus has the potential for short term floodplain impacts in this area. The 100 year floodplain in the vicinity of the ocean outfall forcemain is shown on Figure 7-9.

Figure 7-9 Flood Hazard Areas Along the Ocean Outfall Forcemain Alignment (FEMA 2005)



7.5.3 Long Term / Chronic Impacts

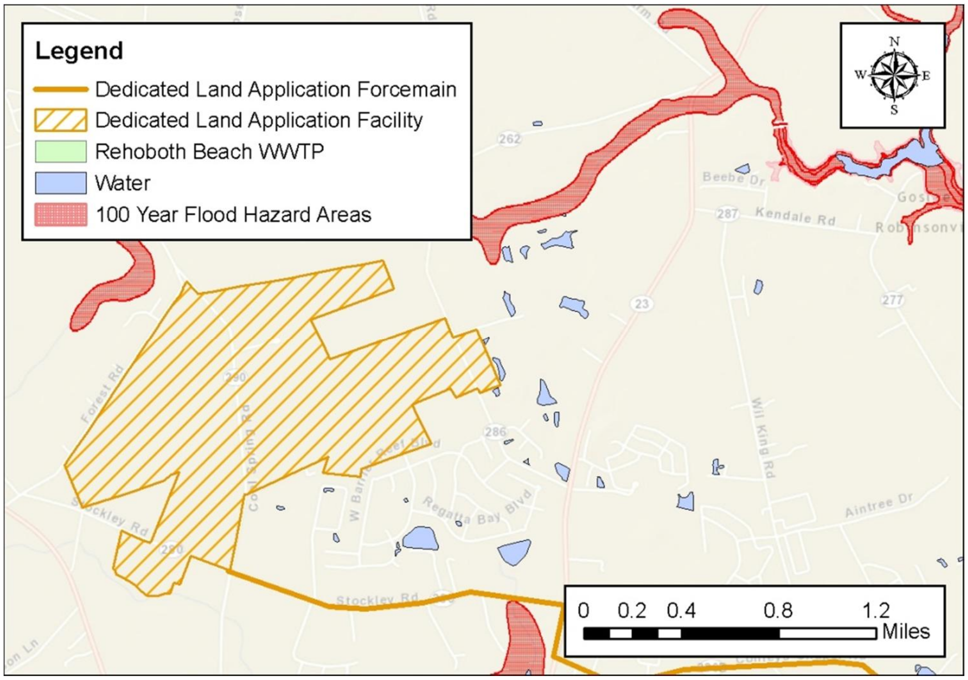
7.5.3.1 No Action

There will be no significant long term impacts on floodplains as there would be no disturbance to existing lands under the no action alternative.

7.5.3.2 Land Application

The forcemain from the RBWWTP would be buried and the land returned to existing grade, and as shown in Figure 7-10, the proposed location for the dedicated land application facility is outside of the 100 year floodplain. Therefore there will be no significant long term impacts on floodplains under this alternative.

Figure 7-10 Flood Hazard Areas Near the Dedicated Land Application Facility (FEMA 2005)



7.5.3.3 Ocean Outfall

There will be no significant long term impacts on floodplains as all new construction for the outfall alternative outside of the treatment plant will be buried and the land returned to existing grade.

7.6 Prime Agricultural Land

7.6.1 Prime Agricultural Land Definition

Prime agricultural land is defined as land that has “the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses … It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods” (Office of the Federal Register 2010). Prime agricultural land in Sussex County includes land with the soil types listed in Table 7-6 and is shown in Figure 7-11.

Table 7-6 Prime Farmland Soil Types (University of Delaware 2002)

Map Symbol	Soil Name
Fa	Fallsington sandy loam (Prime farmland if drained)
Fs	Fallsington loam (Prime farmland if drained)
Ka	Kalmia sandy loam
KbA	Kenansville loamy sand, 0 to 2 percent slopes
KbB	Kenansville loamy sand, 2 to 5 percent slopes
Mm	Matawan loamy sand
Mn	Matawan sandy loam
Pm	Pocomoke sandy loam (Prime farmland if drained)
Pt	Portsmouth loam (Prime farmland if drained)
SaA	Sassafras sandy loam, 0 to 2 percent slopes
SaB	Sassafras sandy loam, 2 to 5 percent slopes
SfA	Sassafras loam, 0 to 2 percent slopes
SfB	Sassafras loam, 2 to 5 percent slopes
Wo	Woodstown sandy loam
Ws	Woodstown loam

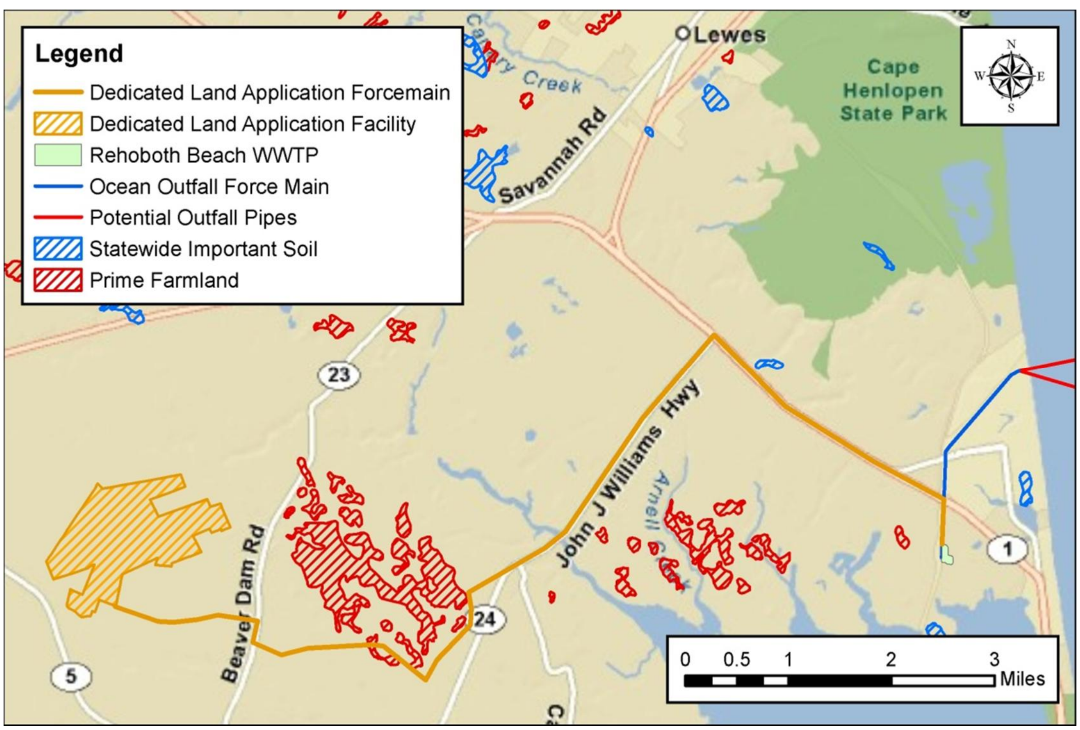
Additional lands of concern are farmlands of statewide importance for the production of “food, feed, fiber, forage, and oil seed crops.” (Office of the Federal Register 2010). Typically this includes lands “that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.” (Office of the Federal Register 2010). Statewide Important Farmland in Sussex County includes land with the soil types listed in Table 7-7.

Table 7-7 Statewide Important Farmland Soil Types (University of Delaware 2002)

Map Symbol	Soil Name
El	Elkton Sandy Loam
Em	Elkton Loam
EvA	Evesboro Loamy Sand, Loamy Substratum, 0 to 2 Percent Slopes
EvB	Evesboro Loamy Sand, Loamy Substratum, 2 to 5 Percent Slopes

Map Symbol	Soil Name
KfA	Keyport Fine Sandy Loam, 0 to 2 Percent Slopes
KfB2	Keyport Fine Sandy Loam, 2 to 5 Percent Slopes, Eroded
Kl	Klej Loamy Sand
Os	Osier Loamy Sand
RuA	Rumford Loamy Sand, 0 to 2 Percent Slopes
RuB	Rumford Loamy Sand, 2 to 5 Percent Slopes
RuC	Rumford Loamy Sand, 5 to 10 Percent Slopes
Ry	Rutlege Loamy Sand
SaC2	Sassafras Sandy Loam, 5 to 10 Percent Slopes, Eroded

Figure 7-11 Prime and Statewide Important Farmland (NRCS 2006)



There is public concern that an increase in the treatment capacity of the RBWWTP would encourage farmlands within the RBWWTP service area to be developed into industrial, commercial and/or residential uses. However, no effluent disposal alternative will affect the treatment capacity of the RBWWTP.

7.6.2 Short Term / Temporary Impacts

7.6.2.1 No Action

No construction will occur under the no action alterative, so there will be no short term impacts.

7.6.2.2 Land Application

Portions of the land application forcemain will be within soils designated as ideal for prime agricultural land. However, the forcemain will follow existing roadways and construction will not have a significant impact on the nearby farmland.

7.6.2.3 Ocean Outfall

No construction will occur within prime agricultural land for the ocean outfall alternative, so there will be no short term impacts.

7.6.3 Long Term / Chronic Impacts

7.6.3.1 No Action

The treatment capacity of the RBWWTP will not be impacted by the no action alternative. Thus, this alternative will not encourage any growth or development that could infringe upon agricultural land.

7.6.3.2 Land Application

The treatment capacity of the RBWWTP will not be impacted by the land application alternative. Thus, this alternative will not encourage any growth or development that could infringe upon agricultural land. The proposed location of the dedicated land application facility is not on prime agricultural land, and all land disturbed for the forcemain will be returned to grade.

7.6.3.3 Ocean Outfall

The treatment capacity of the RBWWTP will not be impacted by the Ocean Outfall alternative. Thus, this alternative will not encourage any growth or development that could infringe upon agricultural land.

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